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ABSTRACT

A cost study was undertaken of the costs incurred by, or allocable to, the Interlibrary Lending (ILL) section of the UCLA Pacific Southwest Regional Medical Library Service (PSRMLS) from June 1, 1976 through May 31, 1977 for filled and unfilled book and journal requests. Mathematical methods were used to establish accurate values of total direct salaries, direct salaries applicable to each type of request, indirect salaries, direct materials applicable to each type of request, indirect materials, and number of each type of request. Cost estimates for interlibrary lending of the PSRMLS, based on Westat's overhead rate (from "A Study of the Characteristics, Costs, and Magnitude of Interlibrary Loans in Academic Libraries,") were compared to results of this study. The study concluded that the great disparity between the PSRMLS overhead rate of 170.8 percent and the Westat overhead rate of 50 percent tends to confirm that Westat omitted some overhead cost categories and/or miscategorized some individual salaries as direct. Cost underestimation of this magnitude could cause serious budget and plan miscalculation. Sections providing detailed information about the PSRMLS, derivations of estimated direct and overhead ILL costs, and data tables are included. (KP)

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Direct and Overhead Interlibrary Lending Costs of the Pacific Southwest Regional Medical Library Service, 1 June 1976 - 31 May 1977

Thomas M. Neustaetter

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August 1977

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THE COST ACCOUNTING PROBLEM

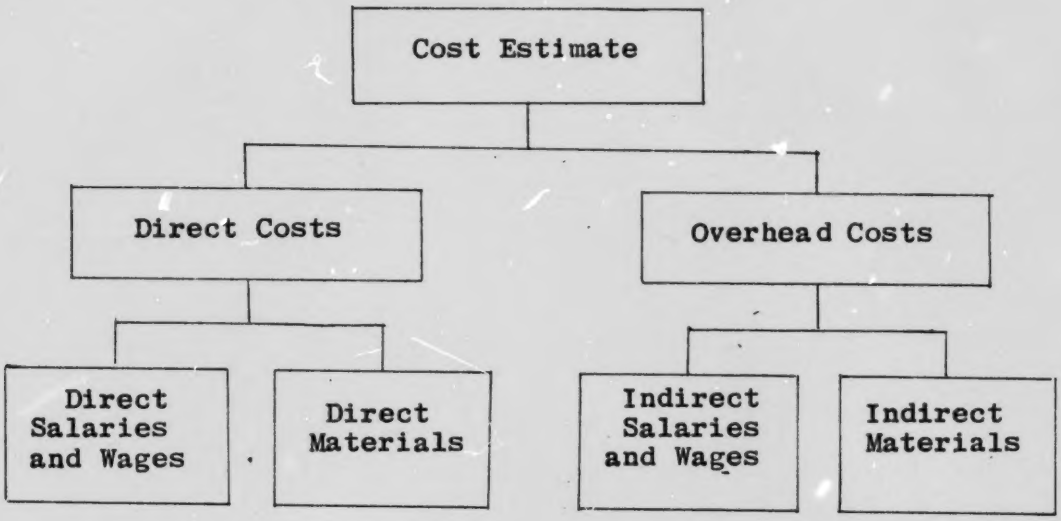
Introduction (Abstract)

This paper should account for the costs incurred by or allocable to the Interlibrary Lending (ILL) Section of the UCLA Pacific Southwest Regional Medical Library Service (PSRMLS), during the interval 1 June 1976 - 31 May 1977, for filled and unfilled book and journal requests. After establishing a reliable overhead rate for each type of request, I will compute cost estimates comparable to those compiled in Westat Inc.'s A Study of the Characteristics, Costs, and Magnitude of Interlibrary Loans in Academic Libraries. A circumspect and judicious apportionment of ILL direct and overhead costs, based principally on a time and motion study, PSRMLS Monthly Statistics, and other data recorded at the PSRMLS, should yield cost estimates more accurate than those calculated with Westat, Inc.'s suggested overhead rate.

Definitions of 'Direct' and 'Overhead'

Cost estimates include overhead and direct cost components. The relation between a cost estimate and its overhead and direct cost components is shown below.

Figure 1



The definitions of 'direct cost' and 'overhead cost' are obverse. By negating the definition of 'overhead cost' one gets the definition of 'direct cost' and vice versa. According to A Dictionary for Accountants (4th Ed.) overhead is

> A generic name for costs of materials and services not directly adding to or readily identifiable with the product or service constituting the main object of an operation. Other items covering the same concept are burden, manufacturing and commercial expense, indirect cost, supplementary expense, and oncost.[1]

In the ILL context, overhead or indirect costs are costs which cannot be identified, at the time accrued, with the disposition of a particular ILL request. Direct costs are costs which can be identified, at the time accrued, with the disposition of a particular request. Examples of ILL

overhead tasks and items are: supervision of student labor, departmental administration, statistical services, utilities, and general supplies. Examples of direct cost tasks and items are: paging journals, verifying bibliographic citations, photocopying journal articles, and book postage. Direct cost items are directly productive of interlibrary loans. Overhead cost items are merely supportive.

Direct and indirect costs may be designated as either salary related or material. Salary related costs are those costs incurred to compensate staff members for their labors, whereas material costs are incurred to purchase goods and services.

Cost Formulae

Since the overhead cost components of filled and unfilled book and journal requests cannot, by definition, be directly assigned, a method must be adopted to allocate equitably total overhead costs to the different types of requests. The allocation of overhead costs is accomplished through the derivation of an overhead rate:

$$R = \frac{I_s + I_m}{D_{ts}}$$

where

R = Overhead Rate

I_s = Indirect Salaries

I_m = Indirect Material Costs

D_{ts} = Total Direct Salaries

Once R is calculated, each cost estimate may be generated with the formula:

$$C_t = D_s + D_m + (R \times D_s)$$

where

C_t = Total Cost

D_s = Direct Salaries Applicable to the Type of Request

D_m = Direct Material Costs Applicable

Unit cost estimates are derived with the formula:

$$C_u = \frac{C_t}{N}$$

where

C_u = Unit Cost

N = Number of Requests

The Westat Study

In 1972 Westat, Inc., under the auspices of the Inter-library Loan Study Committee of the Association of Research Libraries, issued A Study of the Characteristics, Costs, and Magnitude of Interlibrary Loans in Academic Libraries. Although the study is not singularly devoted to the assessment of ILL costs, the compilers indicate:

> The single most important objective of this study is to make available data on the costs of interlibrary loans by academic libraries. Foremost in the establishment of sound library management policies, with regard to interlibrary loans, is valid cost data that can be used for planning at both the national and local level. Several large

> academic libraries have conducted their own in-house cost studies, but there is the requirement of cost data which can not only serve the individual library but which can also provide the building blocks for planning at the national level.[2]

Westat's cost study is based on a 1969-1970 sample of 12 large main libraries and 18 associated branch libraries. Usable cost data were received from all main libraries and from 13 of the 18 branch libraries. Sample cost findings were computed from this data and projected to a universe of 113 large academic libraries. The ILL Section of the UCLA PSRMLS was one of the 13 branch libraries that reported usable cost data.

The Westat cost study suffers from at least three deficiencies: (1) the use of an assumed overhead rate, (2) vagueness about what cost categories are included in overhead, and (3) the possible inclusion of some indirect salary and wage items in the category for direct salaries and wages.

The Assumed Overhead Rate

One of the major deficiencies of Westat's cost study is its use of an assumed overhead rate. Westat assumed that overhead costs were 50 percent of direct salaries and wages. "Previous experience" and "recent findings of a large lending library" are cited as authority for the assumption;[3] however, the nature of the "previous experience" is not stipulated, and "the large lending library" is not named.

Table 3.8 of the study--Cost per request for [main library] lending with various overhead rates--indicates the extent of Westat's uncertainty about the assumed overhead rate. The table is reproduced below:

TABLE 3.8 Cost per request for [main library] lending with various overhead rates

Overhead rate (percentage)*	Estimated lending cost per request	
	Unfilled ($)	Filled ($)
0	1.52	3.43
35	1.94	4.30
50	2.12	4.67
65	2.31	5.05
80	2.49	5.42
100	2.74	5.92

* The overhead rate shown is a percentage of direct salaries and wages excluding fringe benefits

Westat does not provide a comparable table for branch library lending costs; however, given data from the study, one may be readily produced.

TABLE 1 Cost per request for branch library lending with various overhead rates

Overhead rate (percentage)*	Estimated lending cost per request	
	Unfilled ($)	Filled ($)
0	2.05	2.29
35	2.50	2.79
50	2.69	3.00
65	2.89	3.21
80	3.08	3.43
100	3.33	3.71

* The overhead rate shown is a percentage of direct salaries and wages excluding fringe benefits

As indicated in the notes appended to tables 1 and 3.8, Westat does not include the cost of employer paid fringe benefits and payroll taxes in the 50% overhead assumption. "Based on limited data and experience, fringe benefits and taxes were estimated to equal 15% of direct labor for full-time salaried employees. In the institutions studied this was found to be equivalent to 13% of total direct salaries and wages which included part-time staff and students."[4] Hence, if fringe benefits and payroll taxes were considered a species of overhead cost, the assumed overhead rate would be 63% rather than 50% of direct salaries and wages. Fringe benefits and taxes could be explicitly reflected in tables 1 and 3.8 by adding 13% to each of the overhead rates, thereby changing the maximum and minimum rates to 13% and 113%.

Vagueness About Overhead Cost Categories

Given Westat's vagueness about what costs are included under the rubric of overhead, it is difficult to assess the validity of the 50% overhead assumption. Westat asserts that "the overhead costs desired were only those indirect costs directly related to the library, not the entire institution," and enumerates three overhead cost categories: (1) office space, (2) equipment depreciation, and (3) administrative time in supervision, training, and policy discussions.[5] Westat does not, however, reveal whether

the enumerated categories should be considered exhaustive or merely indicative of some possibilities. Examples of significant overhead components not enumerated are: vacation, holiday, and sick leave salaries; accounting and statistical services; office supplies; utilities; and maintenance.

Miscategorization of Indirect Salaries

Westat's vagueness about overhead cost categories does not mask the possibility that some indirect salary and wage items are improperly included in the category for direct salaries and wages. The possibility is particularly apparent in table 3.5 of the study, which shows the percentage time distribution of direct labor over the interlibrary lending tasks delineated below.

LENDING

I. Receiving Request

a. receiving and verifying
b. checking catalog, locating
c. search shelves, pick-up
d. keeping records, check-out

II. Photocopying

a. checking pages requested
b. sending to photocopy
c. copying
d. keeping records
e. preparing, logging invoice, filing
f. processing payment upon receipt

III. Sending

a. wrapping
b. keeping records

IV. Follow-up

a. sending overdue notices
b. keeping records

V. Returned Items

a. unwrapping and inspecting
b. changing records
c. discharging
d. reshelving

VI. Other

Westat, for example, ascribes 19% of professional, 20% of non-professional, and 10% of student direct lending labor to the unnamed tasks designated as 'other.'[6] This is probably excessive, given the great extent to which the specifically named lending tasks encompass the totality of direct lending tasks. If a librarian cannot identify his lending activity, at a given time, with one or more of the named tasks, then he probably is engaged in indirect labor. Other things being equal, if the miscategorized overhead costs were subtracted from direct salaries and added to overhead, Westat's value for $\frac{\text{overhead}}{\text{direct salaries}}$ would, without benefits and payroll taxes included, be significantly greater than 50%. With benefits and payroll taxes included, the value would be significantly greater than 63%.

The Significance of the Failure

If Westat miscategorized some indirect salaries as

direct and/or omitted some overhead cost categories, then (1) Westat's cost estimates are probably inaccurate, and (2) reliance upon Westat's overhead rate could cause ILL librarians and planners to make faulty cost estimates. The effects of any Westat omissions or miscategorizations are shown below in terms of the cost formulae described on pages 3 and 4:

$$R = \frac{I_S + I_m}{D_{ts}}$$

C_t unfilled requests $= D_S + D_m + (R \times D_S)$

C_t filled requests $= D_S + D_m + (R \times D_S)$

I. If Westat miscategorized indirect salaries as direct, the Westat estimates were affected as follows:

(a) I_S was understated.

(b) D_{ts} was overstated.

(c) D_S estimates were overstated for filled and/or unfilled requests.

(d) R was understated.

(e) If the D_S estimates were overstated by equal amounts, C_t 's for filled and unfilled requests were unaffected.

(f) One C_t was overstated and the other C_t was understated by a commensurate amount, if either (1) the filled and unfilled D_S

estimates were overstated by unequal amounts or (2) one D_s estimate was overstated while the other remained unchanged.

(g) C_t for all requests (i.e., C_t for filled + C_t for unfilled) was unaffected. Any cost under- and overstatements for filled and unfilled requests offset each other.

II. If Westat miscategorized indirect salaries as direct, then reliance by ILL planners and librarians upon Westat's overhead rate would have one of the following effects:

(a) If the librarian overstated D_s estimates as Westat did, then his C_t estimate for all requests would be nearly correct. Total costs might, however, be misapportioned between the C_t for filled requests and the C_t for unfilled requests.

(b) If the librarian did not replicate Westat's overstatement of D_s estimates, all his C_t estimates would be understated.

III. If Westat omitted some overhead cost categories, the Westat cost estimates were affected as follows:

(a) I_s and/or I_m were understated.

(b) R was understated.

(c) All C_t estimates were understated.

Reliance upon Westat's overhead rate would, in this case, lead ILL librarians and planners to understate all their C_t estimates.

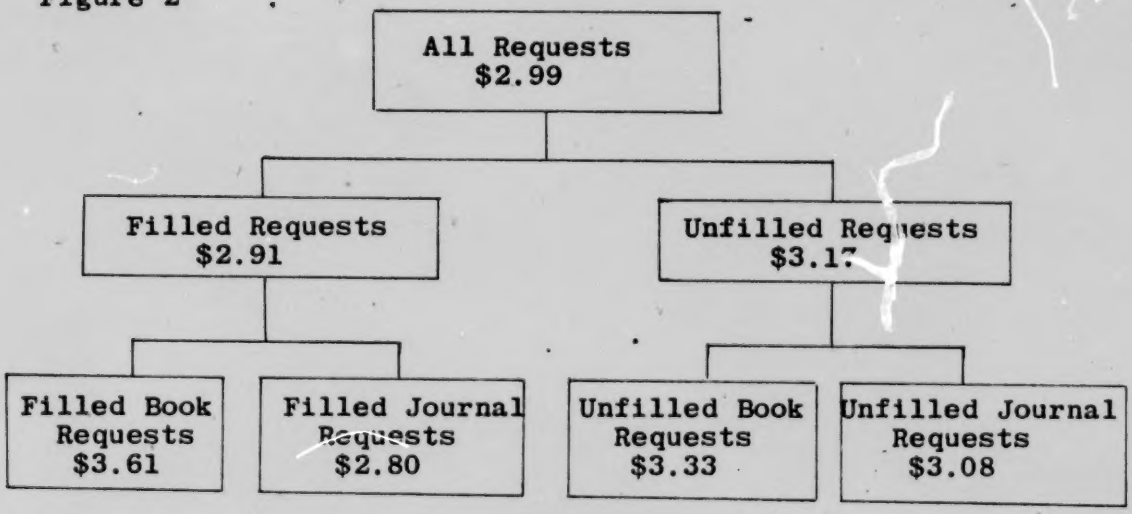
Given the possibilities for cost estimate under- and overstatement, Westat's overhead rate should be thoroughly tested before it is used for planning at the national, regional, state, or local levels. The cost study described in the following sections of this paper provided one needed test. It tested the applicability of Westat's overhead rate to the Interlibrary Lending Section of the UCLA Pacific Southwest Regional Medical Library Service.

FINDINGS

Cost Estimates

The direct and overhead components of PSRMLS filled and unfilled book and journal requests were identified, measured, and recorded to yield a 170.8% overhead rate and the following hierarchy of unit cost estimates.

Figure 2



The unit cost estimates were calculated with the cost formulae $C_t = D_s + D_m + (R \times D_s)$ and $C_u = C_t \div N$. Table 2 reveals, for each cost estimate, the values used in the formulae.

Table 2

COST ESTIMATES	DIRECT SALARIES D_s	DIRECT MATERIALS D_m	OVERHEAD RATE R	TOTAL COSTS C_t	NUMBER OF REQUESTS N
Filled Book	5,179.45	1,260.74	170.8%	15,286.69	4,238
Filled Journal	21,188.76	18,868.19	170.8%	76,247.35	27,191
Unfilled Book	4,837.02	1,781.28	170.8%	14,879.93	4,471
Unfilled Journal	10,929.36	3,962.13	170.8%	33,558.84	10,887
Filled	26,368.21	20,128.93	170.8%	91,534.04	31,429
Unfilled	15,766.38	5,743.41	170.8%	48,438.77	15,358
All	42,134.59	25,872.34	170.8%	139,972.81	46,787

Overhead Rate

The 170.8% overhead rate used to calculate the PSRMLS cost estimates was derived with the overhead rate equation $R = \frac{I_s + I_m}{D_{ts}}$. The overhead rate is shown below as a cumulative function of indirect salaries (I_s) and indirect materials (I_m).

Table 3

		Cumulative Overhead Rate
TOTAL DIRECT SALARIES	42,134.59	
INDIRECT SALARIES		
ILL Section Salaries	12,919.22	30.7%
Holiday, Vacation and Sick Leave Salaries Earned	7,260.34	47.9%
Benefits and Payroll Taxes	8,092.86	67.1%
INDIRECT MATERIALS	4,777.04	78.4%
UNIVERSITY OVERHEAD*	38,906.71	170.8%

*University overhead is cited separately because its salary and material components could not be assuredly segregated. "University" overhead includes library related as well as some UCLA institutional costs.

Conclusion

Given that the PSRMLS overhead rate is valid, the great disparity between the PSRMLS (170.8%) and Westat (50%) overhead rates tends to confirm the suspicion that Westat omitted some overhead cost categories and/or miscategorized some indirect salaries as direct. Absent the different cost coverage and categorization, the Westat and PSRMLS overhead rates would presumably approximate one another. Exactly how closely they would approximate one another, however, is difficult, if not impossible, to determine, because of Westat's vagueness about direct and overhead cost categories. Given Westat's vagueness, it is unclear how Westat would have accounted for all PSRMLS overhead costs, and similarly, it is unclear how Westat's cost data could be supplemented and recategorized to reflect PSRMLS accounting methods.

Had Westat, for example, been more explicit about direct and overhead cost categories, the PSRMLS costs shown on page 15 could be normalized to reflect Westat's accounting methods. The PSRMLS costs could be arranged as follows:

Table 4

A.	TOTAL PSRMLS DIRECT SALARIES	$42,134.59
B.	PSRMLS INDIRECT SALARIES WESTAT WOULD CATEGORIZE AS DIRECT	?
C.	50% OF A + B	?
D.	INDIRECT PSRMLS COSTS FROM CATEGORIES NOT ACCOUNTED IN WESTAT'S 50%	?
E.	ANY REMAINING INDIRECT PSRMLS COSTS	?

B + C + D + E would equal total PSRMLS indirect costs shown on page 15 ($71,956.17). A + B would equal PSRMLS direct costs according to Westat. (C + E) ÷ (A + B) would be the PSRMLS overhead rate comparable to Westat's overhead rate. The smaller the value of E, the closer (C + E) ÷ (A + B) would approximate 50%.

Westat's vagueness constrains any attempts to verify, refute, or apply the 50% overhead rate. Given that the value of (C + E) ÷ (A + B) cannot be determined, the overhead rate cannot be properly verified or refuted; and if the value of (A + B) cannot be determined, the overhead rate cannot be properly applied. If Westat's 50% overhead rate were mistakenly applied to the value of A ($42,134.59) rather than the value of (A + B), the resultant cost estimates would be badly understated (p. 11: IIb). The extent of the underestimation would be as follows:

Table 5

DISPOSITION OF REQUEST	ACTUAL PSRMLS ESTIMATES	WESTAT DERIVED ESTIMATES*
Filled Requests	$2.91	$2.01
Unfilled ""	3.15	2.05

* The Westat derived estimates include 13% for benefits and payroll taxes.

Cost underestimation of this magnitude could cause serious budget and plan miscalculation. For example, if PSRMLS librarians decided to cover all lending costs by instituting a charge for filled requests, application of the Westat overhead rate to the value for A would create a $1.45 per request undercharge. The Westat derived charge would be $3.00, whereas the appropriate charge would be $4.45. Given 31,429 requests filled annually, PSRMLS would run a $45,572.05 yearly deficit.

If the Westat overhead rate is unverifiable and cannot be readily applied to different libraries without serious cost underestimation, then it is of little use to ILL librarians and planners. There seems a need for an explicitly derived and verifiable overhead rate that can be adjusted or normalized to accomodate different libraries and accounting methods. Given the information in the following sections of this paper, the 170.8% PSRMLS overhead rate should fill this need. The following sections provide detailed information about the PSRMLS and the derivation of the estimated direct and overhead PSRMLS interlibrary lending costs. This information makes clear, among other things, (1) direct salary items to which the PSRMLS overhead rate applies, and (2) cost categories which the PSRMLS overhead rate covers.

THE PSRMLS

Work Scope

PSRMLS is one of eleven regional services funded by the National Library of Medicine, and is designed to equalize access to biomedical information within the four state region (Region XI) of Arizona, California, Hawaii, and Nevada. The Interlibrary Lending Section of the UCLA Biomedical Library processes PSRMLS loan requests originating in Southern California, Arizona, and Hawaii, and subcontracts with the University of California, San Francisco to process requests from Northern California and Nevada. According to a recent PSRMLS Budget Proposal:

> [PSRMLS] will provide free supplementary interlibrary loan (ILL) service for the region. Requests for medical and health related materials will be accepted by mail, TWX, and in emergencies, by telephone. Walk-in ILL services will not be provided. Photocopies in lieu of physical volumes will be provided when appropriate.
>
> To assure that its ILL service is of a supplementary nature [PSRMLS] will set quotas of filled ILL's per institution per year. Items longer than fifty pages will not be photocopied, nor items from the PSRMLS restricted lists, and journal physical volumes will generally not be circulated.
>
> [PSRMLS] will refer to other libraries inside the region those requests for medical or health-related material which it cannot fill and for which there is good reason to believe that they might be filled at those libraries. Otherwise all unfilled requests will be referred to the National Library of Medicine unless there is good cause to make one lateral referral.

> Delivery Schedule Required: the PSRMLS will adhere to the following production standards or delivery schedule:
>
> (1) Of ILL's filled in the Library, 85% should be filled by the fourth calendar day after receipt.
>
> (2) Of the ILL requests that cannot be filled, 85% of the requests should be cleared from the library by the seventh day after receipt.[7]

Additional PSRMLS services, for which cost estimates are not provided, include reference and bibliographic services, continuing education programs, a consulting service, workshops for health science professionals, training for MEDLINE search analysts, and regional coordination of MEDLINE services. The only costs accounted are the PSRMLS costs of the ILL Section of the UCLA Biomedical Library. Non-PSRMLS ILL Section costs and UC San Francisco subcontract costs are not accounted.

The ILL Section of the UCLA Biomedical Library processes PSRMLS interlibrary loan requests in conjunction with three other categories of requests. These three categories, in order by declining size, are: (1) requests received through the University of California Intercampus Network, (2) requests billed at established UCLA photocopying rates, and (3) requests received through the Southern California Interlibrary Loan Network (SCILL). During the interval 1 June 1976 - 31 May 1977, 74% of the requests received by the Lending Section were PSRMLS requests; however, it is estimated that 80% of the Lending

Section's work was devoted to PSRMLS. Although processing procedures for PSRMLS requests are largely integrated with processing procedures for other categories of requests, there are several procedures and activities unique to PSRMLS. These unique procedures and activities account for the extra time increment devoted to PSRMLS requests.

Personnel

The ILL Section is currently staffed by four full-time equivalent (FTE) persons funded through PSRMLS and by three FTE funded through UC Intercampus, SCILL, and Biomedical Library line funds. These seven FTE include one professional Associate Librarian, four non-professional Library Assistants, and two FTE Student Assistants. PSRMLS also funds a .5 FTE student in the Biomedical Library Circulation Department to compensate for reshelving and record keeping tasks engendered by the ILL Section.

The current number and composition of staff members does not exactly mirror the number and composition during the period 1 June 1976 - 31 May 1977. Significant changes included the departure of a .25 FTE professional librarian and the replacement of an FTE student by an FTE Library Assistant. Table 6 delineates, for the designated year, gross salaries, net salaries, and net salaries allocable to PSRMLS interlibrary lending. Net salaries are equal to gross salaries minus holiday, vacation, and sick leave salaries taken. Net allocable salaries are equal to 80%

of net salaries. This reflects the estimate that 80% of the Lending Section's work was devoted to PSRMLS requests.

Table 6

GROSS, NET AND NET ALLOCABLE SALARIES: 6/76 - 5/77

	GROSS SALARIES	NET SALARIES	NET SALARIES ALLOCABLE TO PSRMLS
Professional	$17,121.25	$14,637.99	$11,710.39
Non Professional	36,784.01	32,003.43	25,602.74
Student	22,468.89	22,175.85	17,740.68

Work Quantity

The ILL Section handled 46,787 PSRMLS loan requests during the interval 1 June 1976 - 31 May 1977. Sixty-seven percent (31,429) of the loans were filled, and 33% (15,358) were either rejected, cancelled, or unfilled. Eighty-seven percent (27,191) of the filled requests were filled with photocopies, and 13% (4,238) were filled with loaned originals. The photocopied items required 226,847 photographic exposures, for an average of approximately 8.3 exposures per photocopied item.

Table 7 includes extracts from the computer produced PSRMLS Monthly Statistics, upon which the above totals and percentages are based. Some of the relations between the extracted statistical categories, from which other relations may be algebraically derived, are:

(1) Received = Accepted + Rejected or Cancelled

(2) Received = Filled + Unfilled + Rejected or Cancelled

(3) Filled = Loaned in Original (Books) + Filled as Photocopy (Journals)

(4) Unfilled = Accepted − Filled

Table 7

Selected and Aggregated PSRMLS Monthly Statistics

Months	Rec'd	Accepted	Rejected/ Cancelled	Filled	Unfilled	Loaned in Original	Filled as Photocopy	Photocopy Exposures
6/76	3738	3664	74	2573	1091	237	2336	19,256
7/76	3377	3326	51	2371	955	280	2091	17,850
8/76	3365	3291	74	2228	1063	276	1952	16,633
9/76	3915	3825	90	2749	1076	389	2360	20,395
10/76	4638	4504	134	3079	1425	471	2608	20,706
11/76	4218	4113	105	2858	1255	378	2480	21,274
12/76	4391	4221	170	3060	1161	459	2601	21,902
1/77	4120	3960	160	2822	1138	418	2404	20,247
2/77	3708	3581	127	2391	1190	356	2035	16,830
3/77	4119	3999	120	2715	1284	372	2343	19,088
4/77	3670	3561	109	2403	1158	343	2060	16,924
5/77	3528	3418	110	2180	1238	259	1921	15,742
TOTALS	46,787	45,463	1324	31,429	14,034	4238	27,191	226,847

Definitions of 'Unfilled' and 'Filled'

The two categories from the Monthly Statistics for unfilled and rejected or cancelled requests were combined, thereby changing the above mentioned relations from

(1) Unfilled = Accepted − Filled

(2) Received = Filled + Unfilled + Rejected or Cancelled

to

(1) Unfilled = Received − Filled

(2) Received = Filled + Unfilled

The PSRMLS unfilled request cost estimates thus include costs for rejected or cancelled requests.

A request may be unfilled for one or more of the following reasons cited in the Monthly Statistics:

1. Cancelled by requestor
2. Rejected
    a. unacceptably submitted
    b. borrower ineligible
    c. restricted journal list
    d. exceeds photocopy exposures quota
    e. over 50 pages (photocopy)
    f. unidentifiable
3. Unfilled
    a. do not own title
    b. do not own issue
    c. out of biomedical subject scope
    d. non-circulating
    e. missing (officially)
    f. not located
    g. in circulation
    h. in process (acquisition or cataloging)
    i. on order (non-serial)
    j. not yet received (serial)

k. at Bindery
l. verification or additional information required
m. not yet published
n. duplicate request
o. page missing or non-xeroxable
p. citation in error
q. other

Unfilled requests may be either:

1. Returned to sender
2. Referred within region
3. Referred to other regional libraries
4. Referred to the National Library of Medicine (NLM)
5. Referred to non-RML libraries outside region

Requests referred by the PSRMLS to other libraries are considered unfilled, even though they may be subsequently filled. A request is considered unfilled if the requested material is not provided, at the time requested, by the UCLA PSRMLS. If the requested material is provided at the time requested, the request is considered filled.

METHODOLOGY

Methods were followed to establish accurate values for the cost formula variables:

D_{ts} = Total Direct Salaries

D_s = Direct Salaries Applicable to Each Type of Request

I_s = Indirect Salaries

D_m = Direct Materials Applicable to Each Type of Request

I_m = Indirect Materials

N = Number of Each Type of Request

Determination of Values for Salary Variables: I_s, D_s, D_{ts}

The determination of values for I_s, D_s, and D_{ts} included four procedures of particular importance: (1) task analysis and identification of non-task salary items, (2) assignment of costs to tasks and non-task salary items, (3) segregation of direct and indirect salaries, and (4) allocation of unaccounted task salaries to direct and overhead costs.

Task Analysis and Identification of Non-Task Salary Items

During March 1977 the Head ILL Librarian and a Library Assistant directed a complete task analysis of all PSRMLS activities and procedures performed by ILL staff members. Forms were distributed to ILL staff members on which they could record their tasks and subtasks. These

forms were collected, checked for completeness, analyzed to remove discrepencies or duplications, and resubmitted to the staff for final approval. All approved activities and their components are shown in Tables 8,9,12, and 13 of the Derivation of Findings. Appendix A includes sample task analysis forms.

After the task analysis was complete, payroll records were scrutinized to identify non-task salary items (e.g., benefits and vacation salaries). The identified non-task salary items are shown in Tables 15 and 16 of the Derivation of Findings.

Assignment of Salary Costs to Task and Non-Task Salary Items

The assignment of salary costs to tasks required two procedures. One procedure was used for tasks amenable to time and motion study and another procedure was used for tasks not readily susceptive to such study.

For each identified task and subtask amenable to time and motion study six values were determined:

(1) Time Per Request. ILL staff members were requested, by the Head ILL Librarian and a Library Assistant, to monitor and time their own work during a two week period in March 1977. Staff members were given forms on which they could indicate their tasks and subtasks, work start and stop times, and the number of work units completed. Appendix

A includes a sample tally form. Appendix B shows subtask times and includes information sufficient to calculate main task times.

(2) Number of Occurrences in Year. The number of times each task or subtask was performed in the interval 1 June 1976 - 31 May 1977 was deduced from samples taken during the time and motion study, from the PSRMLS Statistics, and from other data recorded in the ILL Section. The following simple example uses the JOURNAL PAGING task and its subtasks to illustrate the general nature of the deductions made.

JOURNAL PAGING	
Sort Journal Requests	100%
Page New Journals	80%
Page Old Journals	20%
Check Location Print-out	55%
Page Unbound Journals	10%
Page in Special Areas	5%
Repage for Bad Photocopies	1%

The percentages shown opposite each subtask were calculated from samples taken during the time and motion study, and indicate relative task and subtask frequencies. For example, the subtask Sort Journal Requests occurred every time (100%) JOURNAL PAGING occurred and the subtask Page New Journals occurred 80% of the time. The PSRMLS Monthly Statistics reveal that 38,078 journal requests were received during the year, and it

can be deduced from the Monthly Statistics that 749 journal requests were rejected or cancelled prior to JOURNAL PAGING. Therefore, JOURNAL PAGING occurred (38,078 — 749) times, and the absolute frequency of each subtask is equal to (38,078 - 749) multiplied by its percentage relative frequency. Appendix B includes relative and absolute frequencies for all subtasks. Main task frequencies can be easily calculated from the relative and absolute subtask frequencies.

(3) Total Hours in Year. The total hours devoted to each subtask is equal to the time per request multiplied by the number of occurrences. Hours accounted for each subtask are shown in Tables 8 and 12 of the Derivation of Findings. The total hours for a main task is the sum of its subtask hours.

(4) Average Applicable Hourly Salaries. Staff members were matched with the identified tasks, and payroll records were examined to determine the average hourly wage for each staff member during the year 1 June 1976 - 31 May 1977. For example, it was estimated that 60% of JOURNAL PAGING was done at $3.07/hour, 20% at $3.40/hour, and 20% at $4.15/hour. The weighted average hourly wage was thus $3.35/hour. Average hourly wages are not shown, but they may be calculated from the information

provided in Tables 8 and 12.

(5) Total Cost During Year. The total cost incurred for a task or subtask is equal to the total hours multiplied by the average applicable hourly salary. Total subtask costs are shown in Tables 8 and 12.

(6) Cost Per Request. The cost per request for a task or subtask equals the total cost divided by the frequency of occurrence. Appendix B includes frequencies and Tables 8 and 12 show total costs.

For each identified task not subjected to time and motion study, ad hoc cost accounting procedures were followed. Examples of tasks not subjected to time and motion study include: (1) ILL Section planning and administration, (2) response to telephone enquiries, and (3) University and Biomedical Library administration allocable to PSRMLS lending. Cost estimates were derived for tasks (1) and (2) by multiplying the estimated daily hours spent on the tasks by the number of work days and the average applicable hourly salaries. For task (3) the University received a negotiated sum of money from the PSRMLS funding authorities. The negotiated sum was used as the cost estimate. Tables 9, 13, and 24 in the Derivation of Findings show salary costs for all tasks not subjected to time and motion study.

After salary costs were assigned to all activities,

salary costs were assigned to non-task items. Payroll records were examined to determine the exact amount of payroll taxes and employer paid benefits during 1 June 1976 - 31 May 1977. Vacation, sick leave, and holiday records were scrutinized to determine the exact number of vacation, sick leave, and holiday hours that were earned and/or taken during the year. The monetary value of these hours was determined by multiplying hours by applicable average hourly salaries. Tables 15 and 16 show the 80% portions of total benefits and payroll taxes, and holiday, vacation and sick leave salaries allocable to PSRMLS interlibrary lending.

Segregation of Direct and Indirect Salary Costs

All identified salary items and their attendant costs were categorized as direct or indirect. The definitions of 'direct', 'indirect', and 'overhead' provided on pages 2 and 3 were used to help effect a proper categorization of direct and indirect costs. Costs categorized as indirect were simply aggregated. Costs categorized as direct were associated with one or more of the four request categories: (1) filled book requests, (2) filled journal requests, (3) unfilled book requests, (4) unfilled journal requests. The task and subtask frequencies and costs applicable to each of the four categories were deduced from the PSRMLS Monthly Statistics, samples taken during the time and

motion study, and other data recorded in the ILL Section. The direct costs applicable to the other three request categories--(1) filled requests, (2) unfilled requests, and (3) all requests--are simple functions of the direct costs for the first four categories.

Allocation of Unaccounted Task Salaries

Once all accounted salaries were categorized as direct or indirect, it was determined that some task related salaries were unaccounted. The time and motion study and cost estimates accounted for less than the 80% of ILL staff work time and salaries allocable to PSRMLS lending. The unaccounted salaries were attributable to non-productive work time not accounted in the time and motion study and the task related salaries. Tables 17, 18, 19, and 20 in the Derivation of Findings show the calculation of unaccounted task salaries, the allocation of unaccounted salaries to direct and overhead salaries, and the allocation of direct unaccounted salaries to the categories for filled and unfilled book and journal requests.

Determination of Values for Material Variables: D_m and I_m

After salaries were accounted, materials were identified, assigned costs, and allocated between direct and overhead. The procedures for identifying, assigning, and allocating material costs were reasonably straightforward, and consumed considerably less time and effort than those for

salary costs.

I. Identification of Materials. Material cost categories were taken from the Document Delivery Services section of the PSRMLS Detailed Budget Breakdown for 15 August 1976 - 14 August 1977. The budgeted material cost categories were refined and checked for completeness by matching them with the earlier identified tasks and subtasks. Tasks and subtasks were analyzed to insure that all materials required for their completion were identified.

II. Material Cost Assignment. Estimated material quantities were multiplied by average unit costs to determine total material costs incurred during the year 1 June 1976 - 31 May 1977. Material quantities were deduced from the PSRMLS Monthly Statistics, from knowledge acquired during the task and subtask analyses, and from miscellaneous data recorded at the PSRMLS. Unit costs were taken from catalogs, from accounting records, and from the Detailed Budget Breakdown.

III. Material Cost Allocation. Most material costs were associated with tasks and subtasks, and divided between direct and overhead according to the classifications of their associated tasks and subtasks. Material costs associated with

direct tasks were classified as direct, and material costs associated with indirect tasks were classified as overhead. Material costs not associated with tasks or subtasks were divided between direct and overhead costs according to the definitions provided on pages 2 and 3. Indirect material costs were simply aggregated; however, direct material costs were allocated between the categories for filled and unfilled book and journal requests. The PSRMLS Monthly Statistics, the task and subtask analyses, the results of the time and motion study, and miscellaneous data recorded at the PSRMLS were needed to make the direct material cost allocations. Tables 21, 22, and 24 in the Derivation of Findings show direct and indirect material costs.

Determination of Number of Requests: N

The number of requests in each request category was calculated from the PSRMLS Monthly Statistics. The request numbers and the statistical categories needed to calculate the numbers are shown below.

Figure 3

REQUEST CATEGORIES AND NUMBERS OF REQUESTS	STATISTICAL CATEGORIES
Filled Book (4238)	Loaned in Original
Filled Journal (27,191)	Filled as Photocopy
Unfilled Book (4,471)	Non-Serial Requests — Loaned in Original
Unfilled Journal (10,887)	Serial Requests — Filled as Photocopy
Filled (31,429)	Filled Requests
Unfilled (15,358)	Unfilled + Rejected or Cancelled Requests
All (46,787)	Requests Received

DERIVATION OF FINDINGS

Direct Salary Components

Table 8 delineates the twenty direct tasks and sixty-one subtasks subjected to time and motion study. The salary costs incurred for filled and unfilled book and journal requests are shown for each task and subtask. The number of hours accounted for each task and subtask is also shown. Table 9 provides similar cost and hour estimates for the three direct tasks not subjected to time and motion study.

Explanatory Notes

(1) NOS: The item requested was owned by the Biomedical Library but was not found in the stacks when initially paged.

(2) Page (2nd) and (3rd): The Biomedical Library stacks are rechecked twice for NOS items.

(3) NIL: The requested item was not owned by the Biomedical Library.

(4) PSUCMM: Pacific Southwest Union Catalog for Medical Monographs

(5) SERLINE: Pacific Southwest Union List of Serials.

(6) CATLINE: Computer searchable data base of NLM holdings.

(7) DOCLINE: Computer communications link between NLM and PSRMLS.

(8) RML 74-26A: Form letter used to provide journal location information.

(9) BK 29 Mail: PSRMLS postage account for books.

(10) Near Quota Requests: Requests from libraries approaching their annual free photocopy limit.

(11) Repage for Bad Photocopies: Journals must be repaged if photocopying mistakes are discovered after journals are returned to the circulation department.

(12) Phone and TWX Status Reports: Staff members answer enquiries about the status of requests.

(13) Reference Work: Work done by the Head ILL Librarian at the Biomedical Library reference desk is shown as a direct charge to PSRMLS lending, because it compensates for ILL bibliographic work done by non-ILL staff members.

Table 8

DIRECT ACTIVITIES AND THEIR COMPONENTS	DIRECT SALARIES BY DISPOSITION OF REQUEST				DIRECT HOURS ACCOUNTED
	FILLED BOOK	FILLED JOURNAL	UNFILLED BOOK	UNFILLED JOURNAL	
RECEIVE REQUESTS					
(a) Gather Requests	16.95	108.76	17.88	43.55	42.9
(b) Initial Processing	169.52	1087.64	178.84	435.48	402.9
LOOK UP CALL NUMBERS					
(a) Alphabetize Requests	76.28		79.51		29.3
(b) Check Public Catalog	487.37		507.96		192.3
(c) Check Other Files	55.97		58.34		22.0
PAGE BOOKS					
(a) Sort Book Requests	33.90		12.22		14.9
(b) Page Books	169.52		61.08		74.9
PAGE JOURNALS					
(a) Sort Journal Requests		163.15		60.83	65.3
(b) Page New Journals		761.36		283.85	314.4
(c) Page Old Journals		266.46		99.37	109.7

Table 8 (continued)

DIRECT ACTIVITIES AND THEIR COMPONENTS	DIRECT SALARIES BY DISPOSITION OF REQUEST				DIRECT HOURS ACCOUNTED
	FILLED BOOK	FILLED JOURNAL	UNFILLED BOOK	UNFILLED JOURNAL	
(d) Check Location Print-out		672.98		250.92	277.2
(e) Page Unbound Journals		179.45		66.92	73.2
(f) Page Special Areas		126.48		47.15	51.8
(g) Repage for Bad Photocopies		57.07			17.0
NOS/NIL JOURNALS					
(a) Sort NOS/NIL Requests		992.51		724.09	273.7
(b) Check NOS/NIL Print-out		503.05		367.04	138.5
(c) Page (2nd) NOS Journals		1182.85		862.92	326.8
(d) Check Circ. File NOS Journals		815.76		595.20	226.0
(e) Page (3rd) NOS Journals		624.04		455.33	176.4
(f) Page in Special Areas		106.62		77.62	29.4
NOS BOOKS					
(a) Sort NOS Book Requests	12.71		9.17		5.1
(b) Page (2nd) NOS Books	214.02		154.33		79.3

Table 8 (continued)

DIRECT ACTIVITIES AND THEIR COMPONENTS	DIRECT SALARIES BY DISPOSITION OF REQUEST				DIRECT HOURS ACCOUNTED
	FILLED BOOK	FILLED JOURNAL	UNFILLED BOOK	UNFILLED JOURNAL	
(c) Check Circ. File NOS Books	196.42		141.63		72.9
(d) Page (3rd) NOS Books	81.09		58.48		29.9
NIL BOOK LOCATIONS					
(a) Check PSUCMM for NILS			272.45		52.6
(b) Prepare to Mail Locations			103.32		19.8
(c) Sort and Mail Locations			42.44		8.1
NOS BOOK LOCATIONS					
(a) Alphabetize Requests			90.15		17.4
(b) Check PSUCMM for NOS's			239.90		46.3
(c) Prepare to Mail Locations			44.69		8.6
(d) Sort and Mail Locations			22.84		4.4
NOS-NIL JOURNAL LOCATIONS					
(a) Sort Requests				193.44	37.1
(b) Check SERLINE & other PO's				1160.64	224.9

Table 8 (continued)

DIRECT ACTIVITIES AND THEIR COMPONENTS	DIRECT SALARIES BY DISPOSITION OF REQUEST				DIRECT HOURS ACCOUNTED
	FILLED BOOK	FILLED JOURNAL	UNFILLED BOOK	UNFILLED JOURNAL	
(c) Attach RML 74-26A Journals				362.70	70.0
(d) Sort and Mail				189.08	36.3
FILLED JOURNAL PROBLEMS					
(a) Retrieve Problem Journals		956.93			137.1
UNFILLED JOURNAL PROBLEMS					
(a) Retrieve Problem Journals				321.65	46.1
(b) Type and Mail Notices				156.68	22.4
UNFILLED BOOK PROBLEMS					
(a) Check CATLINE			114.63		14.8
(b) Check Other Biblio. Tools			525.46		67.9
(c) Check Pre-65 Imprints			147.93		19.1
(d) Type and Mail Notices			118.42		15.3
SPECIAL NEAR QUOTA					
(a) Process Near Quota Requests		19.45		7.00	5.7

Table 8 (continued)

DIRECT ACTIVITIES AND THEIR COMPONENTS	DIRECT SALARIES BY DISPOSITION OF REQUEST				DIRECT HOURS ACCOUNTED
	FILLED BOOK	FILLED JOURNAL	UNFILLED BOOK	UNFILLED JOURNAL	
CHARGE OUT VOLUMES					
(a) Organize Materials	55.09				12.0
(b) Complete Charge Cards	703.51				151.4
(c) Sort Charge Cards	67.81				14.2
MAIL BOOKS					
(a) Process for BK 29 Mail	501.54				108.1
(b) Process for Messengers	12.95				2.8
PHOTOCOPY					
(a) Make copies		2175.28			647.3
(b) Proof Photocopies		978.88			289.3
(c) Sort Photocopies for Mail		190.34			55.1
(d) Mail Photocopies		706.97			209.2
REFERRALS					
(a) Prepare Regional Referral Notices			14.12	31.46	8.8

Table 8 (continued)

DIRECT ACTIVITIES AND THEIR COMPONENTS	DIRECT SALARIES BY DISPOSITION OF REQUEST				DIRECT HOURS ACCOUNTED
	FILLED BOOK	FILLED JOURNAL	UNFILLED BOOK	UNFILLED JOURNAL	
(b) Prepare NLM Referrals			19.61	43.64	12.5
(c) Input on DOCLINE			302.62	673.27	188.2
(d) Prepare Notice of NLM Referral			84.06	187.02	52.6
TWX REFERRALS					
(a) Cut TWX Tape Referrals			40.35	89.60	38.1
(b) Send TWX Tape Referrals			25.26	56.08	24.0
RETURN BOOKS					
(a) Return Books to Circ. Dept.	118.66				28.5
TWX STATUS REPORTS					
(a) Cut TWX Tape Status Reports	.84	5.39	.88	2.16	2.7
(b) Send TWX Tape Status Reports	.78	4.99	.82	2.00	2.5

Table 9

DIRECT ACTIVITIES AND THEIR COMPONENTS	DIRECT SALARIES BY DISPOSITION OF REQUEST				DIRECT HOURS ACCOUNTED
	FILLED BOOK	FILLED JOURNAL	UNFILLED BOOK	UNFILLED JOURNAL	
REFERENCE WORK	154.52	954.50	160.83	389.86	221.0
PHONE STATUS REPORTS	60.70	389.48	64.05	155.94	125.5
CIRC. DEPT. WORK*	787.07	2240.13			986.4

*Total funds transferred to Circ. Dept. = (787.07 + 2240.13) ÷ 80%

Direct Salaries Accounted

Table 10 shows, by disposition of request, the total direct salaries accounted; and Table 11 reveals, by employee category, the total direct salaries and hours accounted.

Table 10

DISPOSITION OF REQUEST	DIRECT SALARIES ACCOUNTED IN TABLES 8 AND 9
Filled Book	3,977.22
Filled Journal	16,270.52
Unfilled Book	3,714.27
Unfilled Journal	8,392.49
TOTAL	32,354.50

Table 11

EMPLOYEE CATEGORY	ACCOUNTED IN TABLES 8 AND 9	
	DIRECT SALARIES	DIRECT HOURS
Professional	3,127.57	406.4
Non-Professional	18,997.31	3503.2
Student	10,229.62	3170.3
TOTAL	32,354.50	7079.9

Indirect Task Related Salary Components

Table 12 delineates the seven indirect tasks and twenty indirect subtasks subjected to time and motion study. The accounted salaries and hours are shown for each task and subtask. Table 13 provides similar salary and hour estimates for the three indirect activities not subjected to time and motion study.

Explanatory Notes:

(1) Support TWXing: Messages about administrative matters are TWXed.

(2) Microfilm Set Up: At the end of each year all requests are microfilmed for archival purposes. All requests must be organized, packaged, and labeled for microfilming.

(3) ILL Section Supervision: The Assistant ILL Section Head supervises and evaluates student work, prepares employee time sheets, orders supplies, and does some public relations work.

(4) ILL Section Administration: The ILL Section Head prepares special reports, oversees the compilation of statistics, writes letters, attends staff meetings, supervises staff work, writes employee evaluations, oversees processing for over quota libraries, and acts as a liason between PSRMLS and other departments in the Biomedical Library, the UCLA Research Library, and the UCSF Library.

Table 12

INDIRECT ACTIVITIES AND THEIR COMPONENTS	INDIRECT SALARIES ACCOUNTED	INDIRECT HOURS ACCOUNTED
REFERRALS		
(a) Tally Referral Statistics	247.91	47.4
(b) Log Biomed Referrals	99.68	19.3
(c) Clear Files Monthly	11.02	2.6
CODING		
(a) Code NILs and Referrals	721.83	123.7
KEYPUNCHING		
(a) Group and Sort Requests	250.78	77.5
(b) Punch from Requests	125.39	39.2
(c) Punch from UCLA Code Sheets	77.20	21.0
(d) Stamp Requests Coded	31.35	11.3
(e) Look up Missing Codes	72.51	21.2
(f) Type Form Letters	99.22	29.3
FILING		
(a) File Filled Photocopy Requests	163.15	38.5
(b) Other Filing and Tallying	151.96	35.5
CLEAR MAIN FILE		
(a) Clear File Monthly	46.79	7.8
SUPPORT TWXING		
(a) Cut TWX Tape Messages	4.08	1.2
(b) Send TWX Tape Messages	1.70	.5

Table 12 (continued)

INDIRECT ACTIVITIES AND THEIR COMPONENTS	INDIRECT SALARIES ACCOUNTED	INDIRECT HOURS ACCOUNTED
MAINTAIN PSUCMM		
(a) Stamp and Sort UCLA Cards	11.12	3.0
(b) Alphabetize and Sort Resource Cards	23.63	6.6
(c) File UCLA Cards	63.94	17.6
(d) File Resource Cards	43.09	12.0
(e) Enter in Location Register	38.92	10.8

Table 13

INDIRECT ACTIVITIES	INDIRECT SALARIES ACCOUNTED	INDIRECT HOURS ACCOUNTED
ILL SECTION ADMINISTRATION	6638.84	884.0
ILL SECTION SUPERVISION	1382.29	217.0
MICROFILM SET UP	166.00	40.0

Indirect Task Related Salaries Accounted

Table 14 reveals, by employee category, the total indirect task related salaries accounted

Table 14

EMPLOYEE CATEGORY	ACCOUNTED IN TABLES 12 AND 13	
	INDIRECT SALARIES	INDIRECT HOURS
Professional	6638.84	884.0
Non-Professional	2691.40	460.8
Student	1142.16	322.2
TOTAL	10,472.40	1667.0

Indirect Non-Task Related Salary Components

The following two tables show non-task related indirect salary components. Table 15 indicates, by employee category, employer paid fringe benefits and payroll taxes. Table 16 reveals, by employee category, holiday, vacation, and sick leave salaries.

Table 15

EMPLOYEE CATEGORY	BENEFITS AND TAXES ALLOCABLE TO PSRMLS LENDING
Professional	2510.70
Non-Professional	5414.54
Student	167.62
TOTAL	8092.86

Table 16

EMPLOYEE CATEGORY	HOLIDAY, VACATION AND SICK LEAVE SALARIES ALLOCABLE TO PSRMLS LENDING				
	HOLIDAYS	VACATION EARNED	VACATION TAKEN	SICK LEAVE EARNED	SICK LEAVE TAKEN
Professional	506.94	1232.45	1255.67	616.22	224.00
Non-Professional	1118.91	1753.31	1641.90	1381.31	1063.65
Student	182.34	260.48	0.00	208.38	52.10

Unaccounted Task Related Salaries

Prior to conduct of the time and motion study and to the provision of cost estimates for tasks and subtasks, it was estimated that 80% of ILL staff work time and salaries were allocable to PSRMLS lending. However, after the time and motion study and the provision of cost estimates, less than 80% of salaries were accounted. Table 17 shows, by employee category, the calculation of unaccounted task related salaries.

Table 17

EMPLOYEE CATEGORY	A GROSS PSRMLS SALARIES	B HOLIDAY, VACATION, SICK LEAVE TAKEN	C NET PSRMLS SALARIES	D TASK RELATED SALARIES ACCOUNTED	E	F UNACCOUNTED SALARIES
				DIRECT	INDIRECT	
Professional	13,697.00	1986.61	11,710.39	3,127.57	6638.84	1,943.98
Non-Professional	29,427.21	3824.46	25,602.75	18,997.31	2691.40	3,914.04
Student	17,945.11	234.44	17,740.67	10,229.62	1142.16	6,368.89
TOTAL	61,099.32	6045.51	55,053.81	32,354,50	10472.40	12,226.91

Note: The relations between the variables are: $A - B = C$

$C - (D + E) = F$

Allocation of Unaccounted Task Related Salaries

The unaccounted salaries were allocated, by employee category, between direct and indirect costs according to the proportions of direct and indirect salaries already accounted.

Table 18

EMPLOYEE CATEGORY	UNACCOUNTED SALARIES	ALLOCATION OF UNACCOUNTED SALARIES	
		DIRECT	INDIRECT
Professional	1943.98	622.54	1321.44
Non-Professional	3914.04	3428.34	485.70
Student	6368.89	5729.21	639.68
TOTAL	12,226.91	9780.09	2446.82

The indirect unaccounted salaries were simply added to aggregate indirect costs, and the direct unaccounted salaries were added, on a pro rata basis, to the four request categories. Table 19 shows the addition of direct unaccounted salaries and Table 20 shows the addition of indirect unaccounted salaries.

Table 19

DISPOSITION OF REQUEST	DIRECT SALARIES ACCOUNTED	DIRECT SALARIES UNACCOUNTED	TOTAL BY DISPOSITION OF REQUEST
Filled Book	3977.22	1202.23	5,179.45
Filled Journal	16,270.52	4908.24	21,188.76
Unfilled Book	3,714.27	1122.75	4,837.02
Unfilled Journal	8,392.49	2536.87	10,929.36
TOTAL	32,354.50	9780.09	42,134.59

Table 20

EMPLOYEE CATEGORY	INDIRECT TASK RELATED SALARIES ACCOUNTED	INDIRECT TASK RELATED SALARIES UNACCOUNTED	TOTAL BY EMPLOYEE CATEGORY
Professional	6638.84	1321.44	7960.28
Non-Professional	2691.40	485.70	3177.10
Student	1142.16	639.68	1781.84
TOTAL	10,472.40	2446.82	12,919.22

Direct and Indirect Materials

Table 21 indicates, by disposition of request, direct material costs incurred for PSRMLS requests during the year 1 June 1976 - 31 May 1977. Table 22 shows indirect material costs for the same year.

Table 21

DIRECT MATERIALS	TOTAL COST BY DISPOSITION OF REQUEST			
	FILLED BOOK	FILLED JOURNAL	UNFILLED BOOK	UNFILLED JOURNAL
REPRODUCTION				
(a) Print Mailers		850.00		
(b) Photocopier Rental		2929.42		
(c) Photocopy Paper		6691.44		
(d) Misc. Photocopy Supplies		117.60		
TELEPHONE	41.69	268.65	46.32	106.54
TWX				
(a) Equipment Rental	119.29	766.85	238.57	579.39
(b) Message Charges			612.11	1498.61
(c) Supplies	19.07	122.57	38.13	92.61
POSTAGE				
(a) Journal Photocopies		7069.66		
(b) Books	550.94			

Table 21 (continued)

DIRECT MATERIALS	TOTAL COST BY DISPOSITION OF REQUEST			
	FILLED BOOK	FILLED JOURNAL	UNFILLED BOOK	UNFILLED JOURNAL
(c) Referral Notices			207.69	508.48
(d) Location Information			468.26	1176.50
SUPPLIES				
(a) Manila Mailing Envelopes		52.00		
(b) Jiffy Bags	529.75			
CATLINE CHANGES			170.20	
TOTALS	1260.74	18,868.19	1781.28	3962.13

Table 22

INDIRECT MATERIALS	INDIRECT MATERIAL COSTS
COMPUTER COSTS	
(a) Computer Time	549.96
(b) Keypunch Rental	780.00
(c) Punch Cards & Paper	150.00
REPRODUCTION	
(a) Coding Sheets	312.50
(b) Microfilming	1005.96
(c) Photocopier Rental	- 59.78
(d) Photocopy Paper	133.83
(e) Misc. Photocopy Supplies	2.40
TELEPHONE	1389.60
POSTAGE	60.00
OFFICE SUPPLIES	333.01
TOTAL	4777.04

University Overhead

During the year 1 June 1976 - 31 May 1977, the University of California charged NLM and the Federal Government an average of 38.5% overhead on all budgeted PSRMLS direct and indirect salaries and materials. Table 23 shows the application of the 38.5% overhead rate to the actual ILL direct and indirect salaries and materials.

Table 23

DIRECT TOTAL SALARIES	42,134.59
INDIRECT SALARIES	
ILL Section Salaries	12,919.22
Holiday, Vacation, and Sick Leave Salaries Earned	7,260.34
Benefits and Payroll Taxes	8,092.86
DIRECT MATERIALS	25,872.34
INDIRECT MATERIALS	4,777.04
TOTAL COSTS	101,056.39
38.5% OVERHEAD	38,906.71

The University overhead rate is negotiated by the University and the Federal Government, and its components are not generally publicized. The only available clues to the university overhead components are from a table contained in a memo to members of the UCLA School of Medicine Faculty Council.[8] The table, reproduced below, is specifically applicable to non-federally sponsored projects; however, the university overhead components for the PSRMLS should not be significantly different.

- REVISED - March 22,1976

Provisonal Negotiated Educational Services Indirect Cost Rates
Applicable July 1, 1974 through June 30, 1975
To Non-Federal Sponsored Projects and/or Programs
Rate Expression Basis - - Modified Total Direct Costs*

Components	On Campus	Off Campus
Maintenance and Operation - Plant	6.70%	
Use Allowance - Buildings	2.66	
Use Allowance - Equipment	2.17	
General Administration	3.42	3.42%
Libraries	3.44	
Departmental Administration	14.79	14.79
Student Services	.86	
Rounded Totals	34.0%	18.2%

* Total direct costs modified by eliminating -
(1) Expenditures for equipment.
(2) Expenditures for alterations and renovations (object code 9700).

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The following table divides, according to the ratios of on campus overhead percentages, (1) the 38.5% PSRMLS university overhead rate and (2) the total ILL Section university overhead costs.

Table 24

COMPONENTS	UNIVERSITY OVERHEAD RATE	ILL SECTION UNIVERSITY OVERHEAD
Maintenance & Operation-Plant	7.58%	7664.62
Use Allowance - Buildings	3.00%	3034.72
Use Allowance - Equipment	2.46%	2490.03
General Administration	3.89%	3929.58
Libraries [e.g., books and materials]	3.89%	3929.58
Departmental [i.e., Biomedical Library] Administration	16.75%	16,924.42
Student Services	.93%	933.76
TOTAL	38.50%	38,906.71

Since some of the components presumably include both material and salary subcomponents, the component costs cannot be readily classified as indirect salaries or materials. University overhead must, due to this problem, be maintained

as a separate indirect cost category.

PSRMLS Overhead Rate Calculation

University overhead was added to the indirect costs from Tables 15, 16, 20, and 22; and the resultant sum was divided by total direct costs to yield a 170.8% overhead rate. The 170.8% PSRMLS interlibrary lending overhead rate is equal to the sum of:

(a) ILL Section Indirect Task Related Salaries---$12,919.22 (Table 20)

(b) Holiday, Vacation, and Sick Leave Salaries Earned--$7260.34 (Table 16)

(c) Benefits and Payroll Taxes--$8092.86 (Table 15)

(d) Indirect Materials--$4777.04 (Table 22)

(e) University Overhead--$38,906.71 (Table 24)

divided by

(f) Total Direct Salaries--$42,134.59 (Table 19).

The overhead rate is shown on page 15 as a cumulative function of (a), (b), (c), (d), and (e).

Calculation of Cost Estimates

The overhead rate was used in the formula $C_t = D_S + D_m + (R \times D_S)$ to calculate total cost estimates. Unit cost estimates were subsequently calculated with the formula $C_u = C_t \div N$. Table 2, duplicated below, reveals the values used in the cost formulae.

Table 2 (duplication)

COST ESTIMATES	DIRECT SALARIES D_s	DIRECT MATERIALS D_m	OVERHEAD RATE R	TOTAL COSTS C_t	NUMBER OF REQUESTS N
Filled Book	5,179.45	1,260.74	170.8%	15,286.69	4,238
Filled Journal	21,188.76	18,868.19	170.8%	76,247.35	27.191
Unfilled Book	4,837.02	1,781.28	170.8%	14,879.93	4,471
Unfilled Journal	10,929.36	3,962.13	170.8%	33,558.84	10,887
Filled	26,368.21	20,128.93	170.8%	91,534.04	31,429
Unfilled	15,766.38	5,743.41	170.8%	48,438.77	15,358
All	42,134.59	25,872.34	170.8%	139,972.81	46,787

The D_S and D_m values for the four request categories--filled book, filled journal, unfilled book, and unfilled journal--are from Tables 19 and 21. The values for N are from the PSRMLS Monthly Statistics. The D_S, D_m, and N values for the remaining three categories--filled requests, unfilled requests, and all requests--are simple additive functions of the values for the first four categories.

The results of the final unit cost calculations ($C_t \div N$) are indicated below:

Table 25

REQUEST CATEGORIES	UNIT COSTS
Filled Book	$3.61
Filled Journal	2.80
Unfilled Book	3.33
Unfilled Journal	3.08
Filled	2.91
Unfilled	3.17
All	2.99

NOTES

[1]Eric L. Kohler, A Dictionary for Accountants, 4th ed. (Englewood Cliffs, New Jersey: Prentice-Hall, 1970), p. 397.

[2]Association of Research Libraries, A Study of the Characteristics, Costs, and Magnitude of Interlibrary Loans in Academic Libraries, Vernon Palmour, et al., compilers (Westport, Connecticut: Greenwood, 1972), p. 13.

[3]Ibid., p. 24.

[4]Ibid., p. 17.

[5]Ibid., p. 15.

[6]Ibid., p. 20.

[7]PSRMLS Budget Proposal: 1 June 1974 - 31 May 1975, p. 5.

[8]Included in memorandum from Associate Dean of UCLA School of Medicine A. Frederick Rasmussen, Jr. to members of School of Medicine Faculty Council, July 21, 1976.

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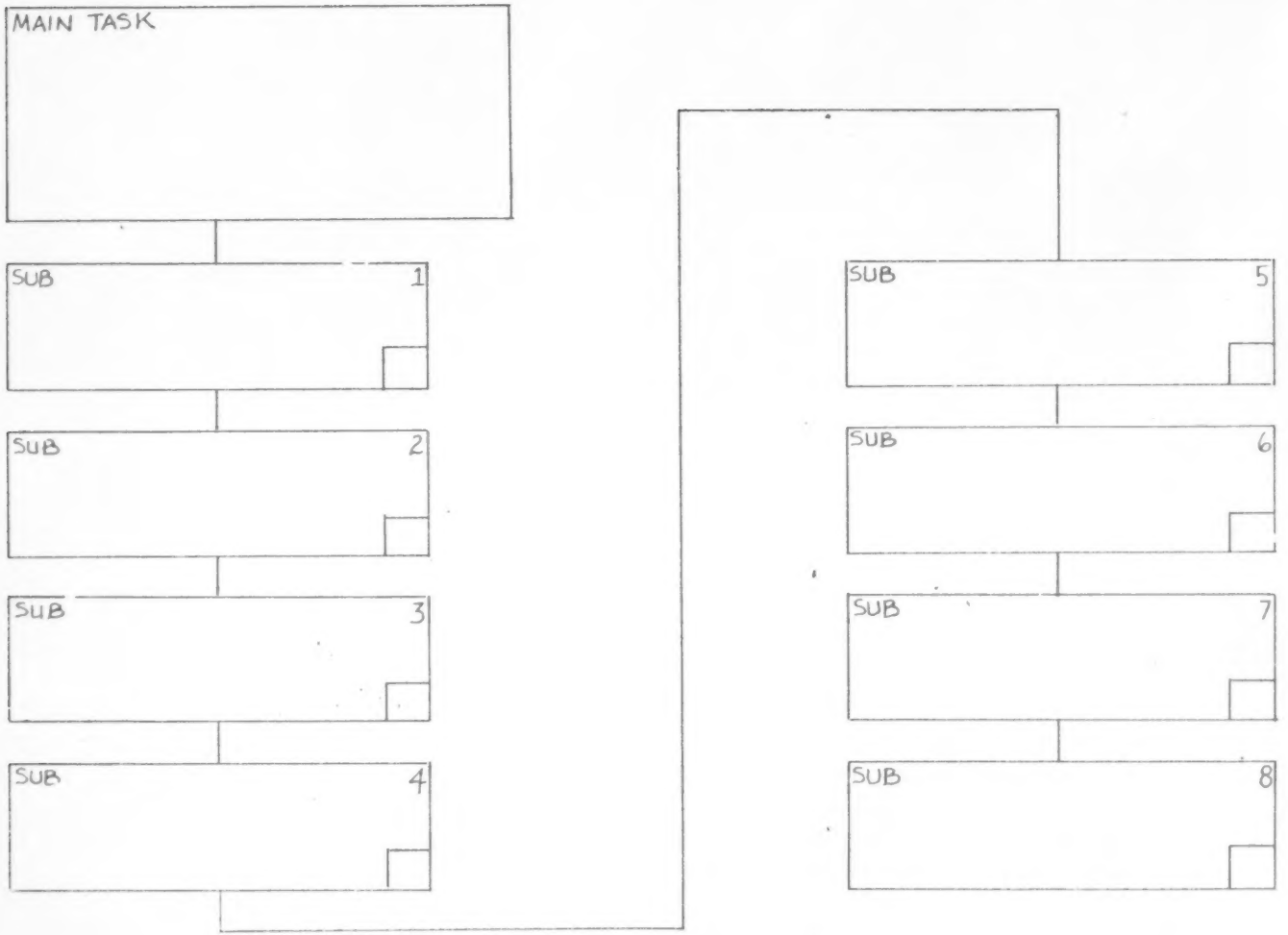
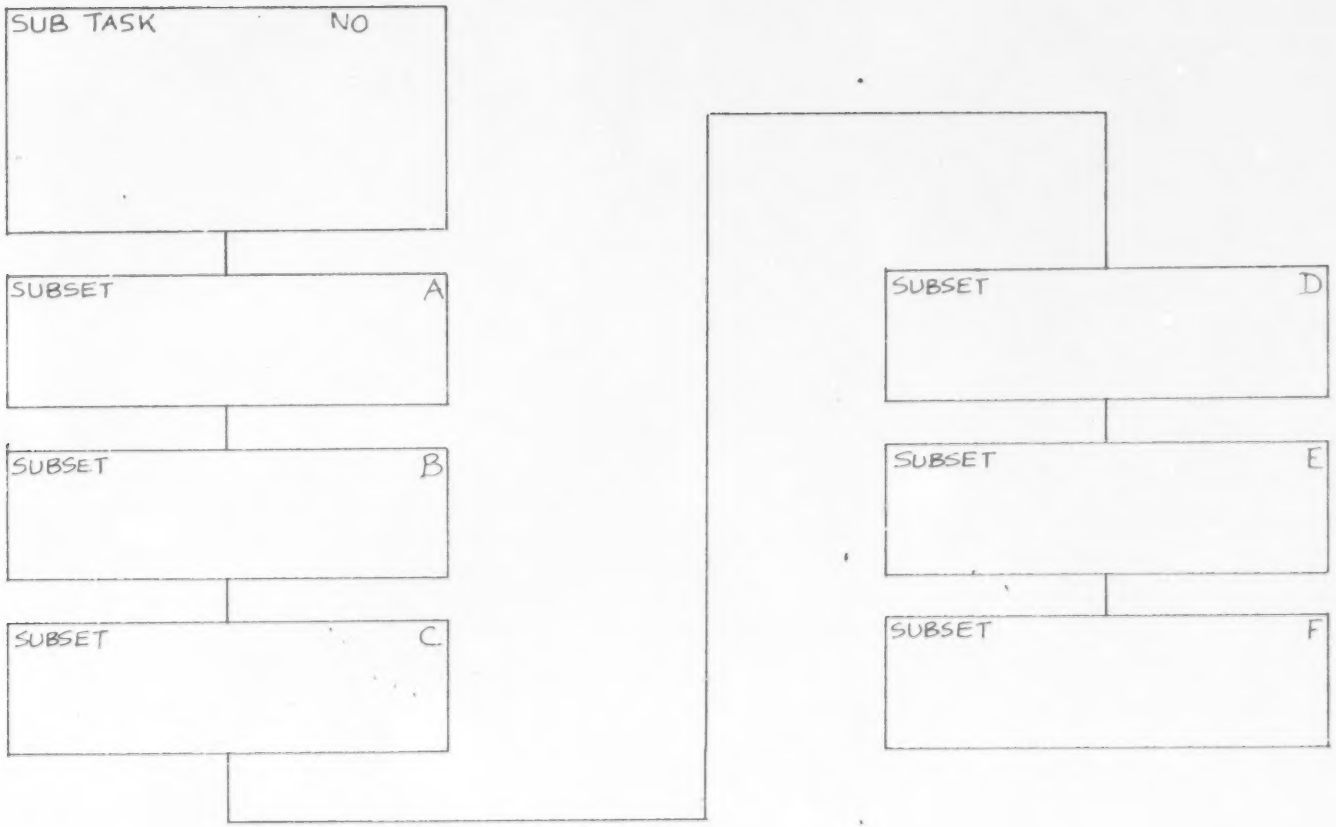
APPENDIX A

Appendix A includes sample main task analysis, sub task analysis, and tally forms. The uses of these forms in task analysis and time and motion study are described on pages 27, 28, and 29 of the Methodology section.

MAIN TASK ANALYSIS FORM



SUB TASK ANALYSIS FORM



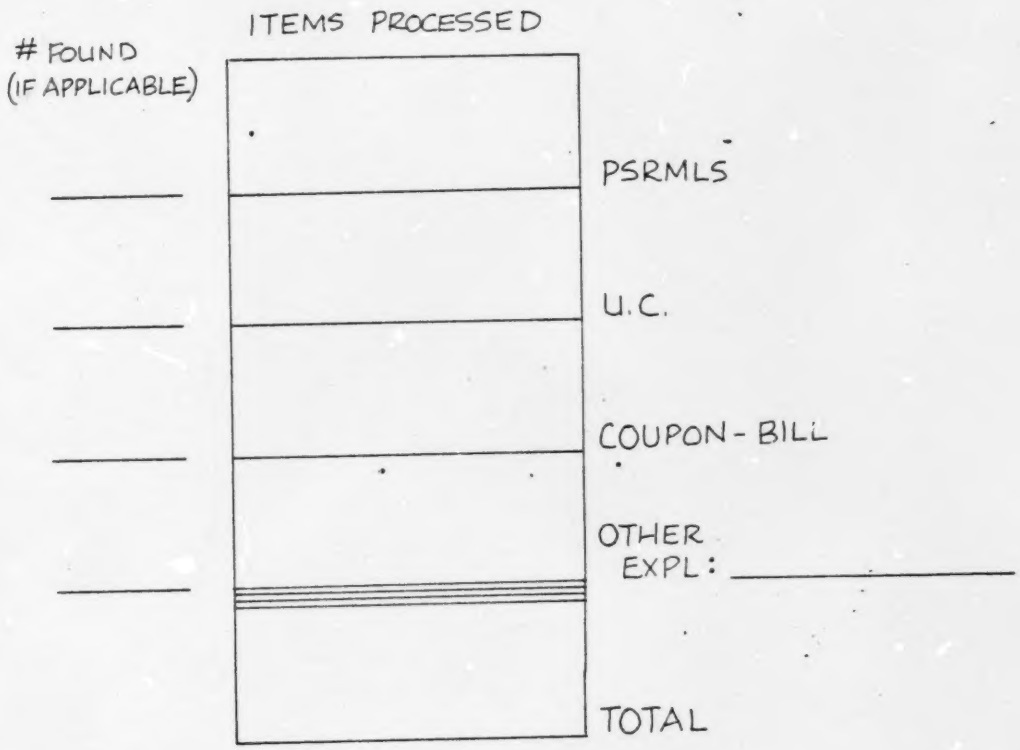
TALLY FORM

MAIN TASK _____

SUB TASK _____

SUBSET _____

START TIME: _____ END TIME: _____



STAFF LEVEL:

APPENDIX B

Tables 26 and 27 show average times as well as relative and absolute frequencies for direct and indirect subtasks subjected to time and motion study. Absolute frequencies and average times are not shown for main tasks, but may be easily calculated. The average time for each main task is a function of its subtask times and subtask relative frequencies. The average time is equal to the sum of the products: (subtask time × relative frequency). The absolute frequency of a main task is equal to the total frequency of any of its subtasks divided by the applicable subtask relative frequency.

Table 26

DIRECT ACTIVITIES AND THEIR COMPONENTS	NUMBER OF REQUESTS BY DISPOSITION				SECONDS PER REQUEST	RELATIVE FREQUENCY
	FILLED BOOK	FILLED JOURNAL	UNFILLED BOOK	UNFILLED JOURNAL		
RECEIVE REQUESTS						
(a) Gather Requests	4238	27,191	4471	10,887	3.3	100%
(b) Initial Processing	4238	27,191	4471	10,887	31.0	100%
LOOK UP CALL NUMBERS						
(a) Alphabetize Requests	4238		4417		12.2	100%
(b) Check Public Catalog	4238		4417		80.0	100%
(c) Check Other Files	636		663		61.0	15%
PAGE BOOKS						
(a) Sort Book Requests	4238		1527		9.3	100%
(b) Page Books	4238		1527		46.8	100%
PAGE JOURNALS						
(a) Sort Journal Requests		27,191		10,138	6.3	100%
(b) Page New Journals		21,753		8,110	37.9	80%
(c) Page Old Journals		5,438		2,028	52.9	20%

Table 26 (continued)

DIRECT ACTIVITIES AND THEIR COMPONENTS	NUMBER OF REQUESTS BY DISPOSITION				SECONDS PER REQUEST	RELATIVE FREQUENCY
	FILLED BOOK	FILLED JOURNAL	UNFILLED BOOK	UNFILLED JOURNAL		
(d) Check Location Print-Out		14,955		5576	48.6	55%
(e) Page Unbound Journals		2719		1014	70.6	10%
(f) Page Special Areas		1360		507	100.0	5%
(g) Repage for Bad Photo-Copies		373			163.6	1%
NOS/NIL JOURNALS						
(a) Sort NOS/NIL Requests		13,596		9919	41.9	100%
(b) Check NOS/NIL Print-Out		6798		4960	42.4	50%
(c) Page (2nd) NOS Journals		10,197		7439	66.7	75%
(d) Check Circ. File NOS Journals		6798		4960	69.2	50%
(e) Page (3rd) NOS Journals		6118		4464	60.0	45%
(f) Page in Special Areas		272		198	225.0	2%

Table 26 (continued)

DIRECT ACTIVITIES AND THEIR COMPONENTS	NUMBER OF REQUESTS BY DISPOSITION				SECONDS PER REQUEST	RELATIVE FREQUENCY
	FILLED BOOK	FILLED JOURNAL	UNFILLED BOOK	UNFILLED JOURNAL		
NOS BOOKS						
(a) Sort NOS Book Requests	2119		1528		5.0	100%
(b) Page (2nd) NOS Books	2119		1528		78.3	100%
(c) Check Circ. File NOS Books	1907		1375		80.0	90%
(d) Page (3rd) NOS Books	954		688		65.5	45%
NIL BOOK LOCATIONS						
(a) Check PSUCMM for NILs			2838		66.7	100%
(b) Prepare to Mail Locations			1845		38.7	65%
(c) Sort and Mail Locations			1845		15.9	65%
NOS BOOK LOCATIONS						
(a) Alphabetize Requests			1528		40.9	100%
(b) Check PSUCMM for NOSs			1528		109.1	100%
(c) Prepare to Mail Locations			993		31.0	65%

Table 26 (continued)

DIRECT ACTIVITIES AND THEIR COMPONENTS	NUMBER OF REQUESTS BY DISPOSITION				SECONDS PER REQUEST	RELATIVE FREQUENCY
	FILLED BOOK	FILLED JOURNAL	UNFILLED BOOK	UNFILLED JOURNAL		
(d) Sort and Mail Locations			993		15.9	65%
NOS-NIL JOURNAL LOCATIONS						
(a) Sort Requests				9672	13.8	100%
(b) Check SERLINE and Other PO's				9672	83.7	100%
(c) Attach RML 74-26A				7254	35.3	75%
(d) Sort and Mail				8221	15.9	85%
FILLED JOURNAL PROBLEMS						
(a) Retrieve Problem Journals		1782			277.0	100%
UNFILLED JOURNAL PROBLEMS						
(a) Retrieve Problem Journals				829	200.0	100%
(b) Type and Mail Notices				829	97.3	100%

Table 26 (continued)

DIRECT ACTIVITIES AND THEIR COMPONENTS	NUMBER OF REQUESTS BY DISPOSITION				SECONDS PER REQUEST	RELATIVE FREQUENCY
	FILLED BOOK	FILLED JOURNAL	UNFILLED BOOK	UNFILLED JOURNAL		
UNFILLED BOOK PROBLEMS						
(a) Check CATLINE			917		58.1	60%
(b) Check Other Biblio. Tools			611		400.0	40%
(c) Check Pre-65 Imprints			229		300.0	15%
(d) Type and Mail Notices			764		72.0	50%
SPECIAL NEAR QUOTA						
(a) Process Near Quota Requests		50		18	300.0	100%
CHARGE OUT VOLUMES						
(a) Organize Materials	4238				10.2	100%
(b) Complete Charge Cards	4238				128.6	100%
(c) Sort Charge Cards	4238				12.1	100%
MAIL BOOKS						
(a) Process for BK29 Mail	4111				94.7	3%

Table 26 (continued)

DIRECT ACTIVITIES AND THEIR COMPONENTS	NUMBER OF REQUESTS BY DISPOSITION				SECONDS PER REQUEST	RELATIVE FREQUENCY
	FILLED BOOK	FILLED JOURNAL	UNFILLED BOOK	UNFILLED JOURNAL		
(b) Process for Messengers	127				78.3	97%
PHOTOCOPY						
(a) Make Copies		27,191			85.7	100%
(b) Proof Photocopies		27,191			38.3	100%
(c) Sort Photocopies for Mail		27,191			7.3	100%
(d) Mail Photocopies		27,191			27.7	100%
REFERRALS						
(a) Prepare Regional Referral Notices			307	684	32.1	18%
(b) Prepare NLM Referrals			1401	3117	10.0	82%
(c) Input on DOCLINE			1401	3117	150.0	82%
(d) Prepare Notice of NLM Referral			1401	3117	41.9	82%
TWX REFERRALS						
(a) Cut TWX Tape Referrals			308	684	138.4	100%

Table 26 (continued)

DIRECT ACTIVITIES AND THEIR COMPONENTS	NUMBER OF REQUESTS BY DISPOSITION				SECONDS PER REQUEST	RELATIVE FREQUENCY
	FILLED BOOK	FILLED JOURNAL	UNFILLED BOOK	UNFILLED JOURNAL		
(b) Send TWX Tape Referrals			308	684	87.8	100%
RETURN BOOKS						
(a) Return Books to Circ. Dept.	4238				24.2	100%
TWX STATUS REPORTS						
(a) Cut TWX Tape Status Reports	20	131	21	54	42.9	100%
(b) Send TWX Tape Status Reports	20	131	21	54	40.0	100%

Table 27

INDIRECT ACTIVITIES AND THEIR COMPONENTS	NUMBER OF REQUESTS	SECONDS PER REQUEST	RELATIVE FREQUENCY
REFERRALS			
(a) Tally Referral Statistics	5,509	31.0	100%
(b) Log Biomed Referrals	1,329	52.2	24%
(c) Clear Files Monthly	5,509	1.7	100%
CODING			
(a) Code NILs and Referrals	15,358	29.0	100%
FILING			
(a) File Filled Photocopy Requests	27,191	5.1	64%
(b) Other Filing and Tallying	15,196	8.4	36%
KEYPUNCHING			
(a) Group and Sort Requests	31,347	8.9	67%
(b) Punch from Requests	31,347	4.5	67%
(c) Punch from UCLA Code Sheets	15,440	4.9	33%
(d) Stamp Requests Coded	31,347	1.3	67%
(e) Look up Missing Codes	2,339	32.7	5%

Table 27 (continued)

INDIRECT ACTIVITIES AND THEIR COMPONENTS	NUMBER OF REQUESTS OR OCCURENCES	SECONDS PER REQUEST OR OCCURENCES	RELATIVE FREQUENCY
(f) Type Form Letters	936	112.5	2%
CLEAR MAIN FILE			
(a) Clear File Monthly	46,787	.6	100%
SUPPORT TWXING			
(a) Cut TWX Tape Messages	12	360.0	100%
(b) Send TWX Tape Messages	12	140.0	100%
MAINTAIN PSUCMM			
(a) Stamp and Sort UCLA Cards	1390	7.7	100%
(b) Alphabetize and Sort Resource Cards	1390	17.1	100%
(c) File UCLA Cards	1390	45.6	100%
(d) File Resource Cards	1390	31.0	100%
(e) Enter in Location Register	1390	28.0	100%